

GRADUATION THESIS

ON

VERTIGO AND ITS

CLINICAL SIGNIFICANCE

BY

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Vertigo popularly known as Giddiness or Dizziness may be defined as "the Sensation of motion without its real existence" (1). The result of this abnormal sensation is that the relationship of the body and more especially of the head to the objects in space is for the time being upset. The equilibrium of the body is an unstable condition and our efforts to overcome this instability give rise to excessive or inharmonious muscular action. Such vertiginous movements are the compliment of the vertiginous sensation and the one frequently accompanies the other.

Vertigo is a symptom which subserves various pathological states or altered conditions of the human organism. Like other clinical phenomena it practically never occurs alone. It is one of the component symptoms existing in various symptom groups which at first sight appear to be heterogeneous. We shall best recognise the significance of this symptom if we can by some method succeed in breaking up these dissimilar groups into allied groups by some method of classification. Now, all classification

must be the last and not the first result of a logical analysis, and can only be arrived at when we are in possession of the facts and from these facts we have inducted our conclusions.

Still for the purpose of description it will be best to state our classification at the outset and to place at the beginning what would more logically come in at the end.

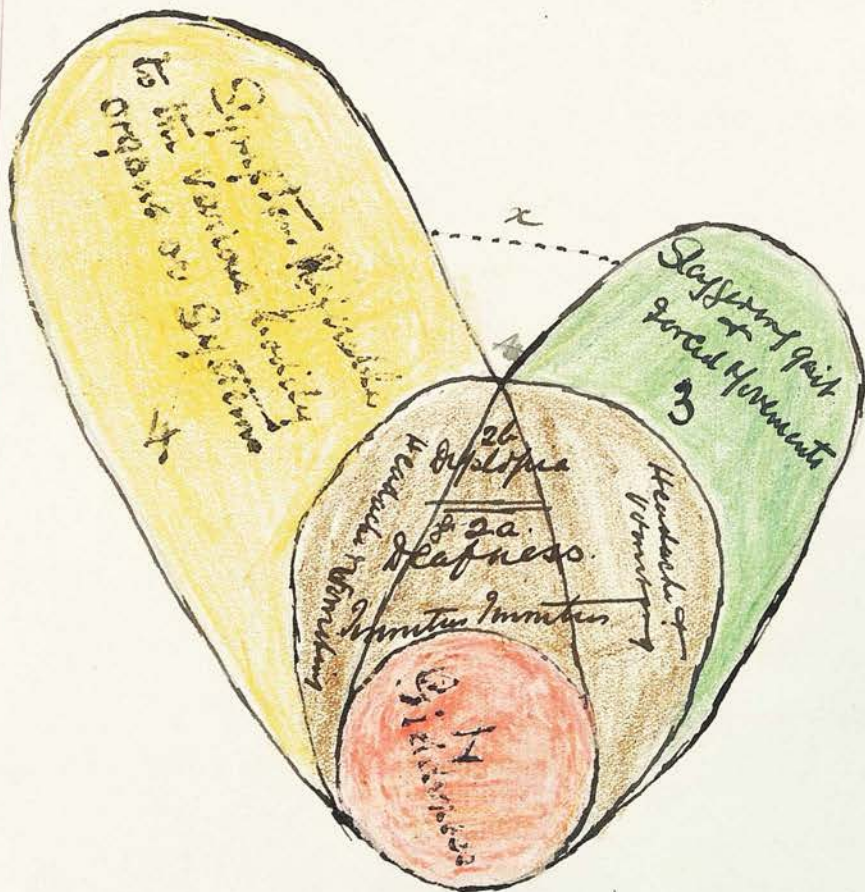
I divide these groups into four symptoms -
Complex in ^{which} each will be found to subserve more or less definitely some altered physiological condition sometimes only mechanical sometimes chemical sometimes more strictly pathological and lastly conditions for which perhaps for want of better knowledge are called functional. The Second symptom Complex is divided into two sub-groups.

Group 1. Vertigo as it exists not alone but with such prominence that it masks for the time being all other symptoms. It will be here found to be for the most part associated with what is called Neurosis.

Group 2. (a) Vertigo as it exists along with tinnitus and deafness and consequently is referred to the ear. (b) As it exists along with double vision and is referred to the eye. To each of these may be added headache or vomiting or both.

Group 3. Vertigo as it exists along with staggering

Have here diagrammatically represented
 the various Symptom groups. It will be
 noted that groups 3 and 4 have no further
 connection with one another after they
 have intersected at the point of the
 Circumference which represents group
 2. A dotted line x however connects
 them at a higher level which is
 supposed to represent the hypothetical
 case of the Prefrontal Lobe.



gait or forced movements to which may be added any or all of the symptoms in the previous group.

This symptom Complex is associated with the Cerebellum and the neighbouring nervous structures which will subsequently be more definitely specified.

Group 4. Vertigo as it exists without the characteristic movements mentioned in the previous group and where one or more of the symptoms in the second symptom Complex may be present and in addition there will be present symptoms and signs associated with diseased condition of the various systems of the body. This group will be found for the most part to be associated with an altered cerebral circulation.

These groups are arranged as symptoms Complex increasing in quantity and intricacy; but for the sake of clearness and that the matter may be the better appreciated and the symptom finally viewed as a single phenomenon ~~divested~~ of its frequent accompaniments, it has been found best to begin with Group two, slowly working our way into Groups three and four, and finally to complete the cycle by coming back to Group one. It may also here be said that when the classification appears to be departed from indications of the same will be noted.

The term Vertigo, Giddiness, and Dizziness will be used without distinction; but it may be here

remarked that dizziness is the best word to use when it becomes necessary to elicit its presence or be certain of its absence by the method of direct question. This method should only be employed when all other means have failed.

At first sight it seems easy to understand by what means the body maintains its equilibrium and appreciates its relationship to the various objects outside itself. The necessary information is derived from the skin by common sensation and by the sense of touch, from the eye by the sense of sight; and also by the muscular sense. But this is not all - by a more careful analysis it is evident that there must be some hidden factor at work which cannot be arrived at by ordinary observation.

If a patient is laid upon a table "with the eyes blind-folded and not a muscle stirring" and the table is gently rotated it is easy to appreciate that the table is in motion and possible to tell with more or less accuracy the angle through which the table is moved and though there is a limit to this the patient can always tell when the movement comes to an end. It is easy to corroborate this by having this experiment performed on oneself. By what means is this information communicated? If we turn to certain experiments that have been made there can be no doubt of the agency at work. This agency is part of the

membranous labyrinth situated in the petrous portion of the temporal-bone. Chiefly the semicircular canals but aided by the utricle and saccule. This knowledge is derived experimentally but is amply confirmed by clinical observation. It would be here out of place to describe the anatomy of this part of the organism. It will however be remembered that the semicircular canals are three in number corresponding with the three dimensions in space (one horizontal and two vertical) and communicating with the general cavity of the labyrinth by five openings (two of the canals coalescing to form one opening) the other four are dilated into ampullae before they communicate with the general cavity. At these ampullar openings are minute hair-like processes in connection with the auditory nerve. These canals in common with the general cavity of the internal ear of which they are prolongations are charged with a fluid called the endolymph. Between the membranous and the bony canals is another fluid called the *perilymph*

If the semicircular canal be exposed no result will be noticed from irritation or damage of the bony parts but if the ampullar endings of the membranous canals be irritated certain movements of the head will take place in a definite direction this direction depending upon the plane of the canal that is affected*. The degree or quantity of the movements will vary with the strength of the stimulus but the quality of the

*As a rule it may be said that the animal will move its head towards the affected side. When one ear is affected the same may be observed clinically (McNair's *Throat and Ear* 3rd ed p470)

movements will be constant, when all the canals are irritated together the movements will be complex. The same kind of movements will be elicited by blowing over the surface of the lymph at the ampullary opening and also by heating and cooling the ampullae. When blowing over the surface of the lymph the head is moved to one side when the direction of the current is reversed the head is moved to the opposite side. These movements consist of inharmonious noddings of the head due to want of co-ordination in the muscles along with these there will be found certain oscillatory movements of the eyeball corresponding to what is clinically known as nystagnus. I have often produced this oscillatory movement in the human patient by rapid rotation of the body and by swinging him round and have also observed it after waltzing. This form of nystagnus is generally extremely slight and will not be seen by the casual observer. Then the membranous canals of an animal have been acted on as indicated it appears to act as if very giddy but the noddings are easily restrained. Birds have been the animals which have been most acted upon. The more delicate movements are affected most. A goose can swim (this I suppose being due to the fact that it derives support from the water) but a pigeon thrown into the air flutters about in an aimless fashion, orderly flight becomes impossible. (The literature connected with the semicircular canal

is associated with the names of Flourens, *Cyon*, Goltz, Ewald, Steiner, Schiff, Politzer, Crum, Brown, and others, but the above remarks are founded on the chapter on Coordinated movements in Foster's Physiology 7th Edition, Part 3. Page 1082.)

Now from all this it may be deduced that any irritation of the ampullar endings directly or any alteration in the pressure of the endolymph will result in similar phenomena which clinically we call symptoms. This alteration in pressure has been carried out by a very simple experiment in man. "Professor Weber-Liel selecting cases of by-gone ear disease in which the ossicles were exposed through gaps in the drum membrane made slight pressure on the head of the stapes with a blunt probe pushing the head ~~with~~ the stirrup bone with its attached membrane inward thereby altering the tension of the intralabyrinthine fluid with the following result.

1st. A loud and prolonged sound like the dwelling on the word ping-g-g-g. 2nd. Giddiness, followed by the loss of power and tendency to fall. 3rd. Vomiting with a sense of faintness but with no loss of consciousness. These symptoms at once disappeared when the pressure was withdrawn" (2).

Another experiment, quite unintentional is related by Dr Kerr Love of Glasgow. Once after the removal of a necrosed stapes "By *insufflating* a powder into the ear by the small perforation through which the

stapés had been brought with almost no pain immediately there was giddiness, vomiting, tinnitus and symptoms of general collapse and in a few minutes violent diarrhoea, these symptoms passed off in a few hours"(3)

Even a very slight pressure on the labyrinthine fluid will give rise to this condition of giddiness and I have frequently been able to take advantage of this clinically. The following is one of several cases:-

A gentleman whom I had frequently attended came suffering from attacks of vertigo which would constantly attack him when walking in the street making it necessary for him to catch hold of the wall or the railing to prevent himself falling. He tended to fall to either side. I found he also suffered from slight tinnitus which did not annoy him much. Deafness was only slight, bone conduction being normal. There was no headache or vomiting and in other respects he appeared in good health. On examining the ears with the speculum I found that both external meatuses contained hardened plugs of wax. Having softened the wax with a solution of bicarbonate of Soda (15 grains to the ounce) this was easily removed by a gentle use of the syringe. This, much to his satisfaction resulted in an absolute and immediate cessation of his troublesome symptoms. The giddiness, tinnitus and deafness entirely disappearing. This was three years ago, and to my certain knowledge he has had no recurrence. I may here however further illustrate

this point by saying that a prolonged use of the syringe will aggravate the giddiness by the stream impinging upon the delicate drum membrane.

It is easy from this to extend our deductions a little further for if pressure on the drum membrane through the medium of the ossicles of the middle ear results in further pressure on the labyrinthine fluid it is evident that the middle ear itself may under certain conditions (e.g. of tension) set up similar pressure and give rise to the same symptoms of vertigo and its associated accompaniments.* Dr McBride has recorded one case of middle ear disease in which the vertiginous symptoms were paroxysmal in character and were completely cured by rational treatment directed to recognised pathological conditions (4) For the same reason attacks of giddiness may sometimes be traced to morbid conditions of the Eustachian tube.

The Thesis I believe cannot be too strongly maintained that anything which disturbs the labyrinthine pressure will tend to produce a certain train of symptom among which vertigo is prominent. This group of Symptoms is the same as that which is termed "Meniere's" disease. This disease rests upon the tripod of Vertigo, Tinnitus and Deafness. It would be better I believe to speak of *Ménieres* symptoms rather than Menieres disease (5) At all events the term should be carefully restricted to this

* In Suppurative disease of the Middle Ear it must be remembered that the Cerebellum may become involved which would of its self give rise to Giddiness as we shall see under Group III

Symptom Complex when it is apoplectic or paroxysmal in character remembering that it may subserve not one but several physical conditions. What Meniere was the first to point out in his classical observations before the Academy of Paris in 1861 was, that a person previously healthy might be suddenly and without warning attacked with vertigo accompanied with Tinnitus and deafness and at least a transient loss of consciousness and the cause of such attacks might be an affection of the Inner Ear. (6) Meniere had ten cases and in one case these symptoms continued unabated in their severity for three days when the patient died. A post mortem examination was made. The brain and the spinal cord were both found to be healthy, the only abnormal condition being a red gelatinous extravasation into the semicircular canals.

I wish now to narrate the history of a case which came under my observation more than a year ago which is I believe of considerable interest, not only because Minieres Symptom Complex was at first extremely well marked, but also with regard to its subsequent development:-

A married woman aged 47 in poor and humble circumstances was suddenly taken with giddiness. She is a worker among oragnes and drinks regularly two glasses of beer a day, and I suspect more when she can get it. Having gone to bed in her usual health she was awakened early next morning (about 5 o'clock) with a

severe frontal headache, & a whistling noise in both ears. On trying to get up she found that she was extremely giddy and could not stand without support. When I saw her the same day she could only walk across the room with difficulty, catching hold of first a chair and then a table, and she tended to fall ^{to} on either side (there was no suspicion of alcoholism)*. The tongue was slightly furred and she could not keep anything on her stomach. Pulse was 82, full and only very slightly tense. Temperature was normal. So also was the heart and urine. On the left side she could only hear the watch in contact with her ear and not at all by means of bone conduction. On the right side she could hear the watch about one inch from the ear and also by bone conduction. I put her on simple milk diet and prescribed alkalies and gentian. Next day I found her giddiness and headache only slightly improved but the other symptoms were unabated. On the third day giddiness, headache and vomiting has ceased. She said she felt much better and only with difficulty could I persuade her to remain in bed: The tinnitus and deafness still remained unchanged. On the morning of the fifth day she was again awakened about 5 o'clock ^{in the morning} with a sharp stabbing pain in both her ankles. When I saw her later, both her ankles were red, swollen, painful, hot, and puffy looking. From this and the subsequent history of the case I had no doubt that she was suffering from acute gout and that it had been so

* I mean of course she had not been drinking to excess. She was a beer drinker which probably had some relationship to the gout.

from the first. The vertigo headache and vomiting did not return. The tinnitus and deafness began to disappear in about a week and two days later the ankles began to improve. Twenty four days from the commencement the tinnitus had entirely disappeared and I then assured myself that hearing was normal on both sides. It was twenty-nine days from the beginning before I could say that the ankles were quite better.

She had the history of what appeared to be a gouty seizure a year previously, which however was not proceeded by similar aural symptoms. I visited her the other day and found she had remained well during the last twelve months, there had not been the slightest return of vertigo or any joint affection.

The evidence in this case is I think fairly strong that the labyrinth~~ines~~es were affected directly similarly to any other membranous structure. We have the blood charged with a poison and for some reason or other choosing these organs for its discharge. The discharge is not complete and five days later a more suitable structure is found in the membranous tissues of the ankle joints. As previously both labyrinths were affected, so subsequently were both ankles. Both attacks took place at the same time in the morning and both took exactly the same time to clear up.

The most valuable monograph that I can find on the relationship between gout and giddiness is by Dr. Buzzard (7) He diverts the attention away from

the labyrinth and seeks to find evidence that the structures sometimes attacked are the nuclei, in the bulb. His point really is to show that Menieres Symptom Complex may subserve other conditions than extravasation into the semicircular canals. In this I think he does especially good service, for Menieres himself had only one autopsy and on very few occasions has this condition been verified. He goes on to point out just as pain would result from irritation of the central end of a nerve of common sensibility as pain is always referred to the periphery, so different symptoms would result from irritation of the central end of the auditory nerve; tinnitus of the cochlear centre were affected and giddiness if the part distributed to the semicircular canals were involved. He further states that a sclerosis in the inferior nucleus of the trigeminus was discovered in severe neuralgia of that nerve. In locomotor ataxia, gastric and laryngeal crises may be caused by irritation of the roots of the Vagus. Lightning pains are due to Sclerosis of the root entrance zone of the posterior columns of the cord both are spontaneous and irregular in their occurrence and they may be absent or present for weeks together. This sclerosis of the vagus nucleus has been demonstrated again and again. He then goes on to illustrate his contention by the case of a man who inherited gout and had one attack but on several

subsequent occasions he had tinnitus aurium followed by vertigo and vomiting for a few days and during the attacks he was stone deaf, the deafness passed away each time with the attacks. He mentions other cases possessing the character of Menieres vertigo which seem to point to a transitory influence upon the auditory nucleus in the bulb. The attacks vary in the same individual, sometimes vertigo, sometimes tinnitus and deafness, sometimes irregularity of the heart's action, therefore he concludes there may be a common cause affecting the nerve centres in the medulla. Finally he adds "We must sometimes look for something in the bulb itself for explanation of vertigo and auditory symptoms, what that something is it is impossible to say, possibly uric acid or some other product of disturbed metabolism".

One of the most classical monographs on giddiness is to be found in one of Trousseau's Clinical Lectures entitled "Vertigo a Stomacho Laeso". Now it is here to be noted that the conclusions arrived at by this keen observer that the stomach was the principle factor in the causation of giddiness was founded chiefly on the effect of treatment directed as he thought to the organ of digestion and that in all cases the direct evidence of the disorder of the alimentary tract was not very pronounced and he himself gives vent to this very significant admission "I have frequently asked myself" he says "whether the treatment which in these cases I directed against the affection of the stomach was not unknown to me

addressed to the nervous system and whether I had not diagnosed a gastric affection rather from the effect of treatment than from the symptoms of the disease; and whether I had not been led into an error of diagnosis by obtaining success from treatment usually employed with benefit in Dyspepsia" (8)

Trousseau it must be remembered is speaking of giddiness of an apoplectic nature, but slight cases of giddiness are surely not very uncommon in disordered conditions of the alimentary tract and slight vertigo differs from the

more violent forms in quantity rather than in quality. Still the absence of this symptom in gastric and intestinal disorders is to be noted as much more frequent than its presence. Supposing that this may be a condition under which vertigo may be produced it must be held that between the gastric affection as the initial physical antecedent and giddiness as the final consequent or effect, there are links in the chain which we cannot with any degree of certainty supply. It may be that the influence is a ~~toxic~~ influence or that the action takes place directly through the fibres of the vagus, its nucleus being in close proximity to the auditory nucleus in the bulb, or it may be as it is dogmatically asserted by Woakes that a vaso-motor influence is at work and that we have to look to the inferior cervical ganglion which gives off the vertebral plexus supplying the

vertebral artery near its origin from the subclavian deep down in the neck and it is from this artery that the auditory apparatus in labyrinth receives its supply. Numerous fasciculi from this ganglion enter the vagus and accompany it to the lungs, stomach and liver. These are afferent in function. From the ganglion go efferent fibres which supply the vertebral and brachial arteries with their plexuses. Impressions from the stomach are therefore conveyed to the ganglion by the former group and thence reflected by means of the latter to the vertebral artery which supplies the labyrinth and by this means the disturbed state of the circulation is conveyed to the brain by the symptom of giddiness (9)

The author maintains his ingenious theory at considerable length associating it with wounds of the brachial plexus, and also with the inferior cardiac nerve to the heart which comes off the same ganglion and is inhibitory in function and through this medium he explains the act of falling in gastric giddiness. Now whether or not it is by this elaborate mechanism that giddiness is brought about: it is perfectly evident that there must be some agency at work other than ordinary gastric irritation for dyspepsia is an everyday occurrence and giddiness in this connection is more or less uncommon. This agency must surely be toxic in character.

Murchison attributed it to lithaemia and was strong

on the idea of gout as an initial cause (10) Before we diagnose gastric vertigo we must exclude all other forms and especially make an exhaustive examination of the ear. "I do not think" says Sir Wm Gowers, "that there is such a thing as definite vertigo of purely gastric origin" "Thirty years ago eighty per cent of the cases of gastric giddiness were supposed to be due solely to this cause but we now know that in ninety per cent of cases of definite giddiness a morbid state of the labyrinth is the real cause of the vertigo. It is probable that in the small remainder of apparently gastric giddiness there is some other influence that is the real cause, e.g. a morbid state of the semicircular canals causing no auditory symptoms and so not to be detected save by its effects" (11)

Illustrating these remarks I shall not recite the following case:-

A young woman aged 28, a domestic servant in an easy situation came to me suffering from a burning feeling in her stomach and a troublesome pain extending from the region of the stomach into the left arm pit. She says she never feels satisfied with her food and immediately she finishes a meal she desires another. The taking of food relieves the pain, also when a clear tasteless fluid comes up the back of her mouth she feels better. She suffers from flatulence, seldom vomits and rarely has headache, her bowels are only relieved twice a week. Her pulse is normal beating

80 to the minute. She has a good set of artificial teeth and her tongue is quite clean. Abdominal examination is negative. Heart and urine are also normal. All organic functions are well performed. She does not look neurotic. Her complexion, look, and attitude give me the impression of a woman in robust health, suffering from nothing but constipation and I treated her accordingly.

I did not see her again for a fortnight when she returned and said she was not the least better and indirectly I could get no further information. I then put the direct question, "Are you ever dizzy?" This elicited the following remarkable story:- She said she often feels dizzy but she thought nothing of that as she has suffered from attacks of dizziness since she was a child and has fallen down stairs and often had *over a year ago, a short time ago she had fallen from a stepladder* fallen and was indignant because some of the onlookers *several times she has fallen down stairs then has staggered and fallen in the street. only a week ago had to* remarked that she was drunk. She falls forward and has often bruised her forehead, there is no evidence of any loss of consciousness except once when she fell down stairs and cut her eyebrow. (there is a slight scar somewhat towards the inner side of the right eyebrow) There is scarcely a year when she has not consulted some Doctor with reference to her stomach pains, but she has never at anytime mentioned the dizziness. Before her dizzy fits she often feels cold and shivers and is better when she can get to the air. On directing my attention to the ear she says "she often feels a buzzing in both her ears as if trains were

whistling". The watch is heard 6" on both sides when gradually drawn away from and about 5" on approaching ears (~~held~~^{heard} by me at 24") bone conduction is normal. On examination with Brunton's auriscope both external and meatuses are plugged with hard and black looking wax, not visible to naked eye examination. There is a very slight oscillating movement of the eyeballs in following the finger from side to side. (This oscillatory movement was verified ~~for~~^{by} ~~me~~^{Miss} Margaret Maclean M.B. and Dr Robt Greive of Hull). I softened the wax in the manner previously indicated and subsequently with the syringe removed ~~about~~^{more than} one third of a teaspoonful from each ear. I saw her four days later, the hearing had distinctly improved, she can now hear the same watch at 10". The stomach symptoms she says are better. On this occasion I endeavoured to inflate the tympanum by ~~Polyzer's~~^{Polyzer's} method. Her dizziness I cannot at present remark on as she is still under my care.

This case needs very little comment unless it be an apology for my own stupidity in not recognising the ear condition from the first. Perhaps it would be better in one's routine in all stomach cases to elicit the presence or absence of giddiness and to examine the ears accordingly. The attitude of the patient towards her ailment has its amusing side. She seems to have imagined that falling from step ladders, tumbling down stairs, and being maligned for being drunk in the street were part of the law of her

being which it was her duty to fulfil and scarcely worth mentioning. We know not what various impressions the labyrinth is capable of conveying to the brain or of reflexly exciting in the bulbar nuclei but it is notable in this case that the ear condition undoubtedly proceeded, and for all I know actually produced the heart burn which distressed my patient. Moreover the auricular branch of the vagus sends two branches to the ear, one of which supplies the lower and back part of the external auditory canal and the skin on the back of the pinna, a fact which is said to be taken advantage of by dinner eating aldermen. (Her whole condition is in my mind still subjudice)

In the rare condition of hyperacusis it is said that some people become giddy from hearing high pitched tones. I have searched the literature of the subject at my command for a specific instance but have so far failed to find one. I have however been fortunate enough in finding an instance of vertigo with low notes. "McVey relates history of a Music master in which symptoms of intense vertigo were induced by the low based notes of a piano indicating an origin in irritated auditory centres from long continued labour as a musci master" (13) This reference appears to me to be of very great interest and so far as I know unique. It is extremely difficult to explain. It may have been due to excited or over-action of the middle ear. It must however be remembered that a

great point in the middle ear deafness is that the patient is deaf to low notes, the high notes being well heard if the infection has not involved the labyrinth. Now with overaction as was perhaps here the case we have a continuous spasm of the stapedius muscle and consequently vertigo. This muscle is supplied by a branch of the facial nerve. Spasm of the facial nerve is not very infrequent especially blepharospasm. With blepharospasm giddiness is very rare but not unknown. I have often tried to produce contraction of the stapedius by tightly contracting my orbicularis palpebrarum. In myself I have never succeeded but have often been successful in others. One patient said not only that she felt a crack in her ear but voluntarily remarked "it has made me giddy:" but only for a moment. In a case of facial paralysis which came under my notice last year there was at first tinnitus and giddiness, this symptom passed off in a few days and was probably due to paralysis of the stapedius. The writer has often experienced the horrible nightmare of falling from a height, - down, down, down: thud - when suddenly to my surprise I feel precipitated on to a woolly bed. This corresponds ~~within~~ to the Nocturnal Vertigo of Gowers (14)

Spasm and paralysis of the stapedius muscle both resulting in giddiness is explained by Foster's experiment of blowing over the endolymph which caused noddings of the head. The head nodding in opposite directions according to the motion of the current.

Children rarely complain of vertigo, perhaps because they cannot explain their feelings. They may frequently however have vertiginous movements. It is very common to see a child roll its head from side to side and this is suggestive of the ear disease. The following remark of Woakes appears to me to be an overstatement, he says "One of the most suggestive symptoms of ear disease in young children unable to explain is the rolling from side to side because it points unmistakably to labyrinthine mischief. The auditory nerve has become involved to the extent of disturbing the equilibrating apparatus" (15)

How much more sober and well balanced is the remark of Eustace Smith "If a child move his head constantly from side to side he is probably annoyed with pain in the head or ear" The former writer is a specialist moreover he has an hypothesis to prove in which he endeavours to fit in every fact, sometimes in the most ingenious manner as in the instance I previously quoted with reference to supposed stomach vertigo

Ingenious but not very convincing is also the well known saying that babies never suffer from vertigo because the rocking of the cradle accustoms them to the motion of the ship.

Group 2a. We now come to cases of giddiness where the initial cause is to be sought for in the organs of vision. We saw at the outset that between the eye and semicircular canals there was a extremely

close sympathetic relationship. Most people can induce slight giddiness in themselves by the most simple experiment. Fix the eyes on any object and gently push one of the eyeballs out of its usual position? double vision will be at once produced along with slight giddiness. Here the late Sir Thos. Grainger ^{Stuart} is undoubtedly in error, he attributed the giddiness to the double vision, and to prove his contention he says close one of the eyes and the giddiness will disappear. He uses the words "Giddiness is the result of the double vision" and again "Paralysis of any of the external muscles of the eye when of recent origin frequently leads to giddiness from double vision" (17)

The giddiness will undoubtedly disappear if the affected eye is closed but if the sound eye is closed the giddiness will not disappear, sometimes indeed it will actually be made worse (18) With the closing of either eye of course there will be no double vision. The truth is that giddiness and double vision are associated conditions and both are partly due to the same antecedents viz: actual paralysis or want of co-ordination in the external ocular muscles along with the false projection of the image. Slight cases are not at all uncommon and severe ones are sometimes met with and apparently it may very occasionally be apoplectiform in character and the patient may lose consciousness. Such cases are said to have been vaunted as instances of epilepsy cured by eye treatment alone (19) The eye learns soon to accommodate itself

to its new conditions and it is in the early stage of the diplopia that giddiness is most associated with it. The concomitant symptom most frequently accompanying is headache but sickness may also be present.

It may be present in post-diphtheritic paralysis (due to paralysis of the ocular muscles) In eye strain in hypermetropia or astigmatism. In its worst form perhaps it is associated with muscular asthenopia of the internal rectus in myopic patients due to constant excessive convergence of the eyes on near objects. Not many cases are so bad as that related by Mr Blundell Carter where brain disease was simulated in a hard reading student. The patient had vertigo along with double vision. Sickness palpitations and intense headache. After going a voyage to Australia, coming back no better and then giving up his prospects in life along with the girl he was engaged to marry and finally being ticketed for the tomb, it was found out that he had to hold his book at 7" and that he could not maintain his convergence for many hours. All that was wrong was a want of harmony in the ocular muscles(20) Asthenopia of the internal rectus.(21)He was completely cured with proper spectacles and shortly after he married the woman of his choice (~~22~~) but paralysis of the ocular muscles may co-exist along with cerebral tumour, and we shall see both conditions are independently capable of causing a certain amount of giddiness.

The important point is that of being able to illuminate.

Group 3. We now pass to consider this condition of vertigo where in addition to one or all of the symptoms we have been considering there is superadded staggering gait or forced movements. This symptom complex will be found to subserve altered states of the central nervous system, notably Disease of the Cerebellum especially in the middle lobe, the pons, the middle Cerebellar peduncle and the Corpora quadrigemina. (Perhaps also in cerebral disease affecting the prefrontal lobe) To illustrate the condition the following case that came under my notice only a few weeks ago may serve as an introduction:-

A.G. Female aged 28, married but without family, she has nothing definite as to her family history. Her surroundings are poor and there is no history of previous illness. She is pale and anaemic looking and is sitting on a seat supporting herself with the hands resting on the back of a chair in front.

In her eyes is a look as if she dreaded some calamity. At first sight it appeared to me as if she has a tumour of the neck in the region of the thyroid but the slightest examination serves to dispel this idea. The prominence in the neck is evidently due to overaction of the posterior cervical muscles: the head being slightly thrown back and kept in this position. She complains of intense occipital and frontal headache and severe and constant giddiness. She feels, she says, as if everything was moving round her. The

The headache is only of three week's duration and the giddiness has only come on during the last ten days and both are increasing in severity. For the last four or five days she has suffered from singing noises in her head. There is slight deafness but bone conduction is intact on both sides. The tick of a watch is only heard two inches from either ear (heard by me at twenty to four inches) She can detect both the high and low notes of an improvised whistle. There is marked nystagmus in both her eyes. Her gait is staggering, she lurches to either side and would fall if not supported. While attempting to walk she spreads her legs wide apart. Her pulse is forty eight regular and of somewhat high tension. The temperature is subnormal. She will not lie down as she says this makes her headache and giddiness more unbearable. The headache is increased by pressure on the occiput. Knee jerks were unfortunately not noticed. There is no history of suppurative ear disease. She also suffered from constant bilious vomiting. She did not appear to me to be in a fit state for any further examination. I felt a little doubt that she was suffering from a cerebellar tumour. She died suddenly four hours after my visit.

Post mortem examination thirty six hours after death Rigor Mortis is passing off. There is no post mortem lividity. The face and body are unusually pale. The sub-scalpular tissue is pearly white in colour. On removing the skull-cap there are no adhesions and

the cerebral vessels are almost empty. The brain was injured on removal and about three ounces of Cerebro-spinal fluid escaped from the ventricles. On examination a tumour is evidently diffused over the entire right half of the cerebellum involving also the pons on the same side. This was examined by Dr T Shennan of Edinburgh and found to be a round celled sarcoma. I did not dissect the brain myself and up till now I have received no report from Dr Shennan which I fully expected I should have been able to incorporate here

Here the headache, vomiting, giddiness and staggering gait in their intensity masked all other symptoms.

The timmitus and deafness though present were quite subordinate. Nystagmus was of a very different description to the slight oscillatory movements that I have before referred to. The contractions of the muscles of the neck and the gait with the legs wide apart were all important points in the diagnose. The slow pulse was doubtless due to pressure of the fluid in the ventricles and this in turn to the initial pressure from the tumour upon the veins of Galen. Giddiness was due doubtless to structural alteration of the cerebellum but must have been markedly increased by the intracranial pressure.

It was not complained of until tendays before death. One peculiar point in this case is that the patient was worse when lying down, the opposite condition is

much more frequent. Referring for a moment to the semicircular canal it has somewhere been pointed out that ~~when~~ the ampullar dilatations on which are the hair like processes are anterior, therefore the endolymph in the horizontal position ceases to stimulate and hence the patient naturally assumes it in ordinary cases of giddiness.* This is a small point but if correct might in doubtful cases enable us to illimate cases of giddiness due to pressure from the endolymph. Another point was the character of the giddiness, objects appeared to move round and round the patient. This form of giddiness has I think been very badly called objective vertigo. In opposition to the other perhaps more usual form where the patient feels he is revolving round the object. This is called subjective vertigo. This refinement does not seem to be of much moment.

Giddiness along with staggering gait are more or less constant symptoms in cerebellar disease and more especially in tumours so typical indeed is this movement that the synonym "cerebellar gait" is frequently used to denote its qualities. It has however to be noted that the staggering may be present even in an extreme degree without the giddiness (22) Nevertheless this staggering gait and certain other forced movements are the exact motor co-relative of which giddiness is the sensory symptom. It is therefore proper that some slight reference should be made

* I cannot find this reference anywhere.

to them here. The movements which take place in cerebellar disease may also be round the vertical or transverse axis of the patient, but we cannot at present locate them with any degree of exactitude. though probably movements round the vertical axis are more common in connection with the lesion of ~~the~~ middle cerebellar peduncle.

The functions and minute anatomy of the cerebellum are still absorbed in considerable obscurity, yet nearly ^{all} competent observers are agreed that its principal function is the co-ordination of the muscular mechanism of the body in such a manner that each group of muscles can play their part as part and parcel of an harmonious whole. It must however be particularly noted that any motor or sensory paralysis will be enough to illimate the cerebellum as the sole agent producing this effect. (Such symptoms may be conceived ~~to~~ be produced by pressure) No kind of movement is missing as the result of cerebellar failure as is the case where the pyramidal or sensory facts are interfered with (23) What is lacking is precision and completeness in the movements. It is also to be noted as is borne out by the case I have recorded that in cerebellar disease pure and simple there is no interference with the psychical powers. Here though the disease was most extensively diffused the mental faculties were clear to the last.

I am enabled by the kind permission of a friend

to give particulars of a case in which tumour of the cerebellum was suspected in life but which after death was discovered to be something entirely different. All such cases are of interest as by careful criticism much more may sometimes be learned from them than from cases of successful diagnoses and moreover in this case the giddiness seems to be the principal factor which upset the diagnosis. I give the notes exactly as I received them:-

"A.B. aged 61, female in whom hysterectomy had been performed four years previously complained of dizziness and great occipital pain for ten weeks previous to her death and sickness for seven weeks which was checked. The headache was very intense preventing sleep. There was no paralysis, deafness gradually set in and became absolute also dimness of vision, the patient ultimately becoming quite blind. Double optic neuritis. Sp. gravity of the urine 1012 albumen 1/6th. Became delirious, knocking herself about the bed causing several bruises. At first knew her relatives by touch and asked for frinks but wandering at the same time imagining herself in confinement. At times more conscious but afterwards passed her urine and foeces in bed. This peculiar mental state lasted for five weeks, but almost up to the last day of her illness could signify by putting her hand to her mouth that she wanted food or drink which she swallowed up to the last day of her life. Post Mortem adherent omentum to cicatrix (in pelvis) of hysterectomy, dilated transverse colon. Pelvis of

of left kidney very much enlarged. Kidney substance diminished cortex slightly diminished. Right kidney had slightly adherent capsule.

Brain. One half ounce yellowish fluid mostly in posterior fossa. There is no trace of any abnormality in the cerebellum and the only condition noted is an intensely oedematus condition of the brain".

It is easy to be wise after the event but I venture to say that the focal symptoms of cerebellar disease were not present either at the beginning of the case or subsequently. If dizziness is left out no one could possibly diagnose a cerebellar tumour, and further dizziness and occipital headache even along with optic neuritis would not be sufficient of themselves to diagnose cerebellar tumour though they might point to obscure brain trouble without focal symptoms. There was no inco-ordination of the eyes or of the muscles of articulation at any rate not noted. The knocking about the bed was to be attributed to her mental condition and could not have been mistaken for forced movements moreover *if* a cerebellar lesion had been present her peculiar mental state must have been due to *superimposed* conditions (e.g. Sufficient quantity of fluid in the ventricles due to pressure on the veins of Galen might however be sufficient to cause this.) It is difficult also to associate the deafness and the blindness with cerebellar tumour though with regard to the matter the double optic neuritis might have been sufficient. No mention is made of the

condition of the heart or blood vessels either ante or post mortem. Enough weight does not seem to have been given to the albuminuria which was evidently at the bottom of the whole business. The giddiness resulted from the altered state of the intra cranial pressure interfering with the blood supply which was also in all probability toxic in quality and in its ultimate analysis the whole condition must be referred to the kidney. This case then in the accordance with the classification that I have ventured to make does not fall within this group. It will be seen shortly that it falls within the next group. It is not my present purpose to go any further into the forced movement connected with cerebellar disease. My intention has been to show that they exist along with giddiness and further that these movements are the exact motor correlative of the sensory symptom that we have been considering.

Group 4. Illustrates vertigo as it exists along with a variety of symptoms which for the most part will be found to be associated with alterations in the cerebral circulation

First of all by referring to a patient with **uterine** cancer I wish to illustrate a great underlying principle:- A woman aged 47 had for more than two years suffered from this condition. In the last stages of this exhausting disease whenever she assumed the upright position she suffered from much ~~giddiness~~ giddiness along with ringing in the ears, soon

obliging her to lie down, otherwise she would have fainted. Her pulse in the horizontal position was 88, immediately on assuming the upright position it ran up to 144. On fixing a well padded abdominal bandage with her feet up, the pulse could be kept at 105 ^{in the vertical} ~~with the feet down~~ position and she had then very little giddiness and no tinnitus.

The giddiness and the pulse are here interconnected and the condition is by no means confined to patients dying from exhausting disease. In a modified form it may any day be found in convalescent patients and even in patients who may have been only a few days in bed. It is also frequently present in certain cases of neurasthenia with or without *Interoptosis*. (The pulse in what appears to be perfect health varies in my experience from zero up to ten beats per minute in the different postures.) The cerebral circulation under the influence of gravity (i.e. in the feet down position) is dependent for its efficacy on the vasomotor nerves proceeding from the great splanchnic area in the abdomen (the cerebral vessels themselves being devoid of vaso motor nerves) and also to a considerable extent it is aided by the strength of the abdominal muscles and an active respiratory centre.* The abdominal muscles are very important and too much despised organs their value has been proved by Leonard Hill (23a) If a hutch rabbit with slack abdominal walls be held up by the ears it becomes

* Leonard Hill on the Cerebral Circulation *Philos. Med.* Vol VII
page 246, 249. 250.

unconscious in a few minutes and in half an hour it dies by bleeding into its own abdominal veins. If the wild rabbit be held up for the same time it does not even loose consciousness. If the hutvñ rabbit has its abdomen well bandaged and is now held up like the wild rabbit it does not loose consciousness (23b)

When in drawing off ascetic fluid the patients begins to yawn and have a feeling of giddiness the same thing is in reality taking place and for this reason everyone employs a binder after the operation. In neurasthenia we probably have some upsetting of the vasomotor mechanism and along with this ~~an~~atomy of all the muscles of the body, there is a physical and mental inso-ordination and along with a veritable host of symptoms there is frequently vertigo more or less intense with ringing or humming noises in the ear. In toning up the body by massage among others the abdominal muscles are strengthened and the vertigo disappears. It must however be noted that there may be a muscular asthenopia such as we have already referred to (23c)

Vertigo may be also present as a symptom in traumatic neurasthenia as Mr Crisp English has shown that it is of very great importance after injuries to the head. It was subsequently complained in twenty two out of a hundred fracture cases existing along with headache and vomiting but apparently without aural symptoms. In three cases the patients returned with further injuries because they had fallen in the giddy

fit. Sometimes the character of the giddiness was paroxysmal. He mentions one particularly interesting case where the scar was situated owing to the intense giddiness produced by its presence. Sometimes there was great irritability of temper, one patients who was a policeman lost his nerve completely and had to be put on a pension. In six cases the giddiness was associated with ascending ladders and working at a height. It was also related to the severity of the injury and the age and temperament of the patient. The antecedent state of health together with the influence of alcohol and the social status of the patient. In one case there had been injury to Broca's area. There was aphasia with severe localised headache and giddiness. It was not nearly so frequent when the patient had been subjected to a lengthy period of treatment (24)

After an experience of nine years of work among aged patients I have come to look upon giddiness as one of the most frequent of all symptoms and with the exception of Prurigo often the most distressing. Very often it is the only thing the aged patient complains of and if it is necessary to put the question, Do you suffer from dizziness ? the frequent answer is "I never have anything else".

Giddiness is too often the first sign of

"The little rift within the lute

Which by and bye will make the music mute".

As a rule it is associated with a rigid radial or a

rigid radial or a tortuous Temporal artery and very frequently there is a clanging first sound. There may or may not be a trace of albumen. Giddiness coming on in a patient over sixty and gradually increasing unless there are some obvious signs pointing in another direction should make us at once think of aoterial degeneration. The importance of it is this, that it is an early symptom and if recognised early much can be done to prevent further advance, and prevention is the essence of all treatment. Work must often be reduced, sometimes permanently stopped. The diet must be reduced and simplified especially as regards the proteids. If the patient has been accustomed to take malt liquors they must be placed under a ban. Sometimes it may be necessary to give drugs and the sheet anchor is here Iodide of Potash. If there are any signs of heart failure it may be combined with Tincture of Digitalis not more than 5 minims twice daily. Digitalis without the Iodide or a nitrite is without exception the very worst drug that can be given (24a).

An old lady aged 79 who was under my care some years ^{ago} suffering from giddiness one day fell down stairs, cut her forehead, lost perhaps two ounces of blood. She recovered remarkably quickly and for the next three months has scarcely any giddiness, this however returned ~~again~~ in all its old severity. The apparent effect in this case of the loss of blood is perhaps a valuable indication not only of the

pathology but of the lines on which a rational treatment should be directed. I should perhaps have remarked that this form of giddiness is frequently associated with tinnitus and deafness but as a rule it is the giddiness that it is most complained of. Giddiness being complained of the finger on the radial artery may reveal a "water hammer pulse" which will unerringly lead as to the aorta as the exciting cause but it may be present in any form of heart complaint though I think worst in aortic disease due to diminished arterial and increased cerebral venous pressure. (Backward)

A high tension pulse with a trace of albumen will lead us to the kidney as the offending organ

The symptom may have its chief relationship to the age of the patient and may exist along with headache and flushes in woman at the change of life. Here I can most strongly co-operate the remarks of Dr Clouster of Morningside that iron especially when combined with sulphate of Magnesia will sometimes work a positive charm (24b)

Giddiness has been said to be indicative of impending cerebral haemorrhage. It is here at any rate of itself of no good whatever but if it exists along with headache in a case of rigid arteries it is some value in pointing to a line of treatment

Vertigo is of doubtful value in cases where cerebral tumours is suspected. There may be perhaps one exception viz. when tumour is situated in the

prefrontal lobe ^{there may be} ~~with the~~ cerebellar symptoms ^{with} ~~but~~ mental symptoms superadded.

Brun has recorder three cases (25). On this point verification seems to be still necessary. It may however be said that anatomical facts point in this direction. Ferrier has shown that experimental lesions on the prefrontal lobe reveal a tract of descending generation which occupies the lobes and innermost area of frontal sections of the internal capsule and the more medially situated fibres of the crus, and may be traced to the upper part of the pons and Flechsig is of opinion that it connects the frontal lobe with the cerebellar hemisphere indirectly through the gray matter of the pons and perhaps connects the frontal region with the motor nuclei in the medulla. There is also evidence that this region has some relationship to movements of the head and eyes (26) If this is true of man we might expect ^{here} vertigo and vertiginous movements to be here of considerable diagnostic value.

Certain conditions of the blood produce giddiness Among drugs the following are the chief Quinine Salicylate of Soda, Veratrum, Viride, Hydrocyanic Acid, Lobelia and the Belladonna group. Perhaps the principal are alcohol and tobacco. The alcoholic seems often to misinterpret his sensation and have what might be called hallucinations of motion. I have more than once heard a drunk man say after he had fallen that the ground rose up and struck him.

In infectious fevers giddiness is often complained of. It is sometimes present in typhus along with the headache. In typhoid Murchison found it present in 36 out of 55 patients whom he questioned on the matter and said it was sometimes present throughout the illness. Of itself it is probably of little importance. In relapsing fever there is great giddiness, patients often taking to bed at once owing to the giddiness rather than to the weakness (27)

Post Diphtheritic vertigo has been mentioned in another connection

A peculiar group of symptoms has been observed in the Geneva Canton in Switzerland. This symptom complex has been called Gerli's disease or paralyzing vertigo. The chief symptoms seem to be ptosis, muscular weakness affecting the extensors of arms and legs, along with cervico-occipital with the head hung down upon the chest and feeble walk. Vertigo and double vision are present but intelligence is not affected. The attacks are sometimes paroxysmal in character. It seems chiefly to attack farm labourers in the warm season. Whether the vertigo is to be traced to the ocular muscles or is cortical in origin it is impossible to say. The ocular muscles seem to be attacked symmetrically. It has been compared to poisoning with the conium maculatum. No case has been recorded in this country (28) (28a)

There are two diseases of the central nervous

system each with a multitude of symptoms in which giddiness may be present, but in which this symptom cannot be traced to the cerebral circulation. I venture to say that in-organic disease limited to the spinal cord giddiness never occurs. Over great tracts of the body there may be disorder of common sensation and the muscular sense with great inco-ordination^{but without Vertigo}. This is especially the case in locomotor ataxia and here the symptom of giddiness is for the most part conspicuous by its absence. Yet in Tabes giddiness does occasionally occur: But under what conditions? Precisely under those conditions which we consider under Group 2.

(1) In disturbance of the labyrinth or auditory nerve and is thus only connected indirectly with the primary disease. (29)

(2) When the ocular muscles are involved (30)

When it is remembered that in Multiple Scler~~oses~~ses apparently any part whatever of the central nervous system may be affected. It is not to be wondered at that vertigo is not an infrequent symptom. It may be present with or without nystagmus, actual paralysis of the ocular muscles is rare. (31) Charcot describes the vertigo of Multiple Scler~~oses~~ses as gyratory in character. "All objects" he says "seem to be whirling round with great rapidity and the individual himself seems to be revolving on his axis" he lays considerable stress on this symptom in differentiating in obscure cases between this and

paralysis agitans and locomotor ataxia (32)

A sclerotic patch may involve the cerebellum ~~on~~ one of its peduncles when we might have giddiness and all the symptoms of tumour with the absence of pressure symptoms (33).

Group I.: We have now discussed and as far as possible illustrated giddiness in many forms and have seen the part it plays in various symptoms complex and tried to estimate its importance in diagnosing the patient's illness but there is as yet an all important something of which we have said practically nothing, viz: the individual - the patient himself. Giddiness is a sensation and a sensation is psychologically unthinkable apart from the consciousness of it. The organ by which sensations are translated into consciousness is not only the brain but the brain acting as a whole. It is as it were the necklace on which the beads are strung, the inner vinculum binding the whole together. The balancing of the body which is continuously in action takes place un-noticed by the higher centres. It is only when it is out of tune that it is interpreted in consciousness, by what we call vertigo. Some brains are far more sensitive to stimuli than others and what produce this sensation in one will often have no effect on another. We have only to consider the various forms of giddiness from what we call external causes to see this at once. Many suffer from tower or cliff giddiness, doubtless due to impressions received through the eye out of

harmony with the impressions usually received by that organ. Probably there are far more who do not suffer at all. Agoraphobia on the other hand is the rarest of rare conditions but owns a not very similar external cause. So rare indeed is this condition that we scarcely think of any external cause but say it is due to a functional disorder of the internal mechanism in some unknown manner. We are wrong: the cause in both and in all instances is the sum of the conditions which go to make up the effect and the patient's organism is generally the greater part of the sum, yet we too often consider the patient as if he were the mere theatre in which the action were taking place. In sea sickness and swing giddiness, which are probably not dissimilar conditions not only is there inharmonious impressions received by the eye but probably there is a want of harmony in the respiratory and abdominal movements (and this it may be said perhaps explains the somewhat comforting action of a tight abdominal belt;) but in addition to this there must be continuous varying impressions conveyed by the labyrinth of the ever changing conditions. Yet everyone is not sea sick or swing sick.

But there are cases of giddiness which search as you will no external or obvious exciting cause can be found. Let me very briefly state one with which I am acquainted:— A female patient aged 38 in comfortable circumstances with a small family frequently sends for me. One day I find her suffering from palpitation and

with perhaps the exception that she is passing large quantities of pale limpid urine of low specific gravity I can find no serious matter. Very quickly she recovers. In a few weeks I am sent for again. She is suffering from migraine in which giddiness is a symptom. Again she quickly recovers. Next time it is headache she feels, she says, as if her eyes ^{are} ~~were~~ filled with lead. Yet again I visit her. She is in bed suffering from giddiness. She says she feels as if the bed and herself ^{are} ~~were~~ rising up and down and sometimes as if she ^{only} ~~her~~ ^{is} ~~were~~ being raised up in the air and brought down again. There is no tinnitus, no deafness, no headache, not even vomiting. I have told her that she need not be alarmed, there is nothing the matter with her that will shorten her life by a single day and she is pleased. This is not a case of hysteria. I would think twice before I told an hysterical patient there was nothing the matter. I should get a letter the next day telling me not to come back. Still less is it a case of neurasthenia. The attacks are short and may be months apart, and in the interval she is a hard working capable housewife. I well know of course that between these three conditions the line is very thin, but this class of patient is nervously afraid of being thought hysterical.

I only once saw what I could call an apoplecticiform attack of vertigo and in this case

Meniere's symptom complex was entirely absent.

I was visiting one evening at the house of a lady who was in the best of health, suddenly she told me that she was feeling very giddy. She was able to help herself on to the floor where she lay literally holding on to the carpet. From the first she was acutely aware that her surroundings and ^{her} temporary sensation were at variance. Her feelings she said were "terrible" She felt as if she were tossing on the waves of the sea. With the exception of violent retching and vomiting which appeared in half an hour, no other symptom was recognised. She remained in this condition two and a half hours when she gradually recovered and went to bed. She slept well and awakened next morning in her usual health. This happened six years ago and since then there has been no return of anything resembling it. She says that about eight years previously she had a similar attack. Of this lady's history I have an intimate knowledge. It is she whom I have already mentioned as turning giddy for a moment after she contracted her orbicularis Palpebrarium. She comes of a neurotic stock, though her father and her mother did not show and trace of neurosis. They made a consanguineous marriage and on the father's side there was one sister in whom there were suspicions of insanity. The whole of this sister's family (three daughters, cousins of the patient) became insane, the only surviving member being now in an asylum.

(There is however considerable evidence that the neurotic inheritance was also derived from the father) There are many other cousins in which signs of neurosis are present, but slight. The patient has herself one sister who is suffering from insanity at the change of life. The other sisters, four in number are more or less neurotic. There is a brother who is not. The patient is ridiculously afraid of black beetles. When she reads aloud for a very short time her voice becomes husky and tends to disappear (34) She suffers ^{much} from ~~an~~ occipital headache and ~~obscure~~ gastric trouble. Some time ago along with stomach ~~trouble~~ trouble she began to get very thin and haggard looking. She had dragging pains in her back, related at first to the periods which were regular but ultimately this pain became almost constant and was always worst in the morning, a very suspicious sign. She also suffered from insomnia, her husband became very alarmed about her and sent her to get the best advice. The doctor reassured her there was nothing serious the matter. She walked out of his house somewhat ashamed she should have troubled him but relieved. She began to put on flesh. The pains in her back never returned and she got well without any special treatment. This lady cannot ride in a railway carriage or carriage of any kind without feeling giddy. She is peculiarly susceptible to swing giddy ~~and~~ sea sickness and at one time could

not watch the waltzers in a ballroom without feeling giddy. I may add also that she is peculiarly susceptible to loud sounds.

Perhaps I need not apologise for having quoted this case at considerable length - what appeared at first to be a single symptom was in reality one of many symptoms so they occurred separately and at long intervals. *all probably related to a neuropathic diathesis*

Giddiness is not an infrequent epileptic aura and is said sometimes to replace the fit (petit mal). A patient whom I attended aged 62 who has the stigmata of syphilis knows by the giddiness about two minutes beforehand when to expect the fit (35). If what has already been stated with regard to prefrontal lobe ^{les.} *be correct.* it seems to be not improbable that we may have a nerve storm beginning its path in the prefrontal lobes loss of consciousness not being complete until the motor areas are affected in the ordinary epileptic fit.

Grainger Stuart relates a peculiar case of giddiness along with headache and double vision in a boy of fourteen years. For seven years he had regular periodic attacks at more or less equal intervals of 81 days, the attacks usually last about five days

Additional Remarks: It has been shown both physiologically and clinically that a very close connection exists between the labyrinth and the eye

Of late years proof has become more clear how this connection exists anatomically. This is effected by means of the posterior longitudinal bundles in their connection with Deiters nucleus. By means of this fasciculus the different nuclei of the ocular nerves are inter-connected and perhaps the nuclei are ~~perhaps~~ connected with those of the other. ^{Side} These bundles are in relation with Deiter's nucleus. This nucleus is not only a nucleus of the eighth nerve it is the "way station" from which impulses ^{are} ~~are~~ sent by means of the posterior longitudinal bundles up to the various nuclei as far as the third nucleus and "downwards to the anterior horn cells of the spinal cord, especially to those in the cervical and lumbar regions" (36) Therefore it is highly probable that the labyrinth by this means can send its impulses to all the motor nuclei to the body and thus exert its balancing power.

A tract passes from Deiter's nucleus to the cerebellum in the Restiform body (37) probably to the middle lobe, and it has been shown by Turner (38) that other strands pass in the reverse direction to this same nucleus. It is in the cerebellum that what is sometimes called "unconscious sensation" takes place

By what ~~paths~~ ^{paths} these fibres reach the cerebral ^{Cortex} ~~is to~~ ^{is to} ~~obscure~~ ^{be} entered into here

The optic nerve has connection with the ocular nuclei probably through the medium of the corpora quadrigemina with which it is connected (39)

It is to these anatomical facts that we must look

for the basis of our knowledge of giddiness
Clinically it is to be noted that tinnitus is never
present in a purely ocular vertigo but slight
oscillatory movements of the eyeball result from
labyrinthine giddiness. The path of the fibres easily
explains this.

Light has also lately been thrown on the
association of vertigo and cerebral pressure. Some
remarkable successes in curing or improving cases of
deafness and giddiness have been reported by
Babinski (40) in connection with the operation of
lumbar puncture. By this means he proves the
relationship ^{between} of the labyrinthine and cerebral spinal
fluids thus incidentally suggesting that giddiness
associated with cerebral pressure may in its ultimate
analysis be referred to the Labyrinth* as the great
end organ, one of whose principal functions is to
maintain the balance of the body.

*Just as Buzzard ~~ref~~ So referred it from the Bulbar
nuclei

S U M M A R Y

-----oOo-----

1. Giddiness is sometimes a very important symptom and may indeed be the Key to the Diagnosis.
2. Clinical experience shows that the two peripheral end organs that regulate the balancing mechanism of the body are the eye and the ear.
3. The mechanism of the semicircular canals is extremely sensitive and may be upset by a very slight and sometimes contemptible cause e.g. wax in the ear.
4. The poison of gout may produce a train of symptoms which cannot at first be distinguished from "Menier's Disease"
5. Cases of stomach vertigo are to be looked upon with great suspicion. The ear and stomach act and react upon one another.
6. Vertigo pointing to grave cerebral disease may be entirely due to inco-ordination of the ocular muscles.
7. The Cerebellar &c. disease, the Vertiginous movements are more important than the vertiginous sensation.
8. Anything which tends to upset the cerebral circulation may cause giddiness.

9. The abdominal muscles are extremely important organs. Their weakness may be discovered by unusual irregularity of the pulse in the horizontal and vertical position and of this vertigo is an important sign

Tinnitus

10. ~~Giddiness~~ may exist along with cerebellar vertigo and also with vertigo resulting from altered cerebral circulation. If present with ocular vertigo we should suspect ~~something behind it~~ *that the diagnosis is at fault.*

12. If vertigo occurs in Spinal Disease the intracranial part of the nervous system is probably involved

13. Some cases of giddiness are only to be explained by a study of the family and life history of the patient.

14. The fine oscillatory movements of the eye ball are of doubtful value as many people have not complete command of their ocular muscles.

The Subject of Giddiness is a very difficult and a very complicated one. This alone I know for certain that there is much that I do not know, much that I do not understand. I am sceptical of my own conclusions. I am sceptical of my own scepticism.

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